To Check the Feasibility and Existence Scenario of Scheffler Reflector Applications in India

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Abstract—*Solar energy can generally be described as a way to use the sun's heat and light for different applications. Despite its multiple benefits as a clean, modular, simple source of energy, the implementation of solar energy is not as widespread as one would hope. But today solar energy is becoming a ray of hope for Indians growing energy need.*

This research shines a new light on the different applications of scheffler reflector in India. Fortycasesarepresented where Schefflerreflectorsare installedamongcommunity kitchen, laundry, process heat, refrigeration and air conditioning etc.

The short payback period of the installation cost of the plants make it reliable and promising investment. The feasibility and existence of scheffler reflector applications in India is quite good. Also there is needed to grow awareness among peoples to spread it to domestic as well as industrial level

1. INTRODUCTION

In the last decades, the increasing energy crisis in developing countries and climate change hazards has created awareness to promote the renewable energy technologies. The Sunisamassivereservoirofcleanenergyandthepowerfromthesun'sraysthatreachthe earthiscalledassolarenergy.Solarenergyisthemostreadilyavailablesourceofenergy. Solarenergyreceivedintheformofradiationcanbeconverteddirectlyorindirectlyinto otherformsofenergy suchas heatandelectricity whichcanbeutilized by theman. Solar energy can be harnessed by two methods, solar thermal and solar photovoltaic. India is a country where demand exceeds supply. At present the energy deficit stands at 8.7%for 2013-14. Commercial energy consumption is responsible for 28 % of India's total energyconsumption. If commercial opt for solar energy for their various applications, not only it will help tominimize the power deficit condition but also it is very useful for our environment. India hasenormous potential for solar power. It is among the most promising area in the world in solarenergy field. Solar energy development in India can be very important tool not only for economic development of the country but also it will reduce the pollution level of country byreducing CO_2 emission. Thus it will have positive impact on our environment.

2. CASE STUDY OF SCHEFFLER REFLECTOR APPLICATIONS

A case study has been done to know the feasibility and existence of different scheffler reflector applications installed in India. A questioner was developed to collect the data of the scheffler reflector plants in India. The question include in the questioner were ranging from year of installation, size of plants, applications, operating parameters, functional status, installation cost and supplier etc. A case study of 40 plants is developed using this questioner. Based on this case study few results and findings are:

1. State wise location of Scheffler plants in India

Figure1 shows the state wise installationlocation of scheffler reflector plants in India. Gujarat with 9 plants has the maximum number of scheffler plants in India. Karnataka and Rajasthan have 5 plants each.

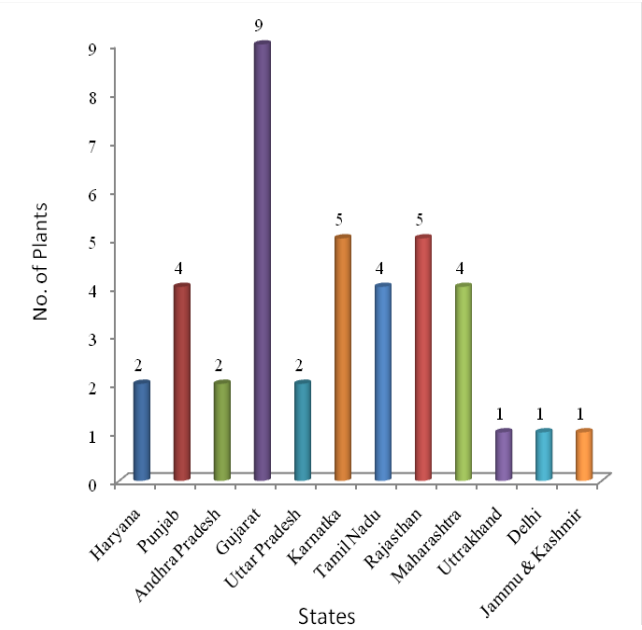

Fig. 1: State wise locations of Scheffler plants

Punjab and Maharashtra has 4 plants each. Support from the government in form of subsidy and other technological help resulted in increasing demand of scheffler plants in these regions. Also the major suppliers of scheffler reflectors are concentrated in these regions.

2. Percentage distribution of scheffler plants according to the applications.

In pie chart Fig. 2shows the various applications of the scheffler plants with their share. Out of total 40 plants 72% of plants have application of community kitchen cooking. 17% plats has application of process heat and laundry purposes by steam generation while 8% plants have application of air conditioning.

3. Total installation cost distribution of scheffler plants

Fig. 2 shows the case study of 40 scheffler plants in terms of total installation cost. The bar graph shows the total installation cost distribution. It can be seen that out of 40 plants, 17 plants have total installation cost below 20 lakhs while

13 plants have total installation cost of scheffler between 20 to 50 lakhs. 5 plants have total installation cost 50 to 100 lakhs and 2 plants have more than 100 lakhs. The total installation cost of scheffler reflectors depends upon various factors which are as follows:

- Size of plant (Size of each reflectors)
- Number of scheffler reflector
- Tracking system used
- Preferred Location
- Either get subsidy or not

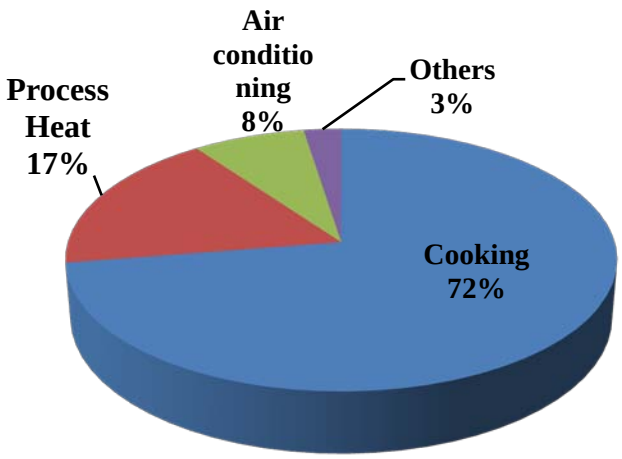

Fig. 2: Percentage distributions of scheffler plants according to application.

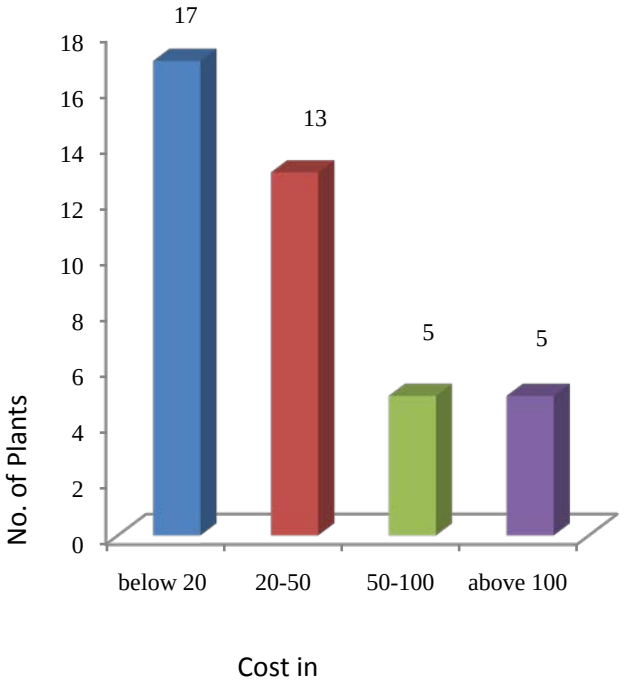

Fig. 3: Total installation cost distributions of scheffler plants

3. CONCLUSIONS

This study and analysis provide us following conclusions:

1. The scheffler reflector has a number of applications such as Cooking, Laundry & process heat, Air conditioning, Steam generation, Agriculture etc.
2. Almost every plant was found functional with little regular maintenance.
3. The scheffler reflector is fulfilling the expectations of consumers.
4. There is a continuous growth in the installation of scheffler plants year by yearshows awareness and popularity of the benefits of scheffler reflector among customers.

REFERENCES

[1] A. Munir, O. Hensel, W. Scheffler., 2010, “Design principle and calculations of a Scheffler fixed focusconcentrator for medium temperature applications”, Solar energy, vol. 84, pp 490-502.

[2] A. Munir and O. Hensel., 2010, “On-farm processing of medicinal and aromatic plants by solar distillation system”, biosystems engineering, vol. 106, pp 298-277.

[3] José Ruelas,Nicolás Velázquez, JesúsCerezo.,2013, “A mathematical model to develop the Schef -type solar concentrator coupledwith a Stirling engine”, Applied Energy, vol. 101, pp 253-260.

[4] G. Angrisani, K. Bizon, R. Chirone, G. Continillo, G. Fusco, S. Lombardi, F.S. MarraC. Roselli, M. Sasso, R. Solimene, F. Tariello, M. Urciuolo, F.Miccio., 2013,"Development of a new concept solar-biomass cogeneration system", Energy Conversion and Management, vol. 75, pp 552-560.

[5] PiaPiroschkaOtte., 2014, "A (new) cultural turn toward solar cooking Evidence from six case studies across India and BurkinaFaso", Energy Research & Social Science, vol. 2, pp 49 58.

[6] AnjumMunir, Oliver Hense, Wolfgang Scheffler, Heike Hoedt, WaseemAmjad,Abdul Ghafoor., 2014, "Design, development and experimental results of a solar distilleryfor the essential oils extraction from medicinal and aromatic plants", Solar energy, vol. 108, pp 548-559.